BEFORE THE DEPARTMENT OF MONTANA FISH, WILDLIFE & PARKS
OF THE STATE OF MONTANA

In the matter of the repeal of the opening of a new HD 330 – Greenhorn Mountains with 1 limited bighorn sheep license 330-10; and the amendment of the 2010 Bighorn Sheep Conservation Strategy pertaining to bighorn sheep management.	))))	RULEMAKING PETITION

August 28, 2018

TO: FWP Commission and FWP Director Martha Williams

1. Petitioner's name and address is Gallatin Wildlife Association, P.O. Box 5317, Bozeman, Montana, 59717.

2. Petitioner will be affected through long term loss of wildlife viewing and hunting opportunities, and through continued high cost efforts to rescue and transplant sheep in small, isolated populations exposed to extirpation.

Petitioner Gallatin Wildlife Association (GWA) submits this petition on behalf of its members. GWA is a local, all volunteer wildlife conservation organization which is dedicated to the preservation of wildlife and wildlife habitat in Southwest Montana. GWA is a non-profit 501(c)(3) organization which has been in existence since 1976 representing hunters, anglers, and other wildlife advocates with the mission to protect habitat and conserve fish and wildlife populations on a sustainable basis for our children and future generations. GWA believes in the ethic of fair chase public hunting and fishing opportunities for all. We support the Montana constitution which states: "the opportunity to harvest wild game is a heritage that shall forever be preserved" and that "the legislature shall provide adequate remedies to prevent unreasonable depletion of natural resources."

As hunters and wildlife advocates, our concern is that the current management strategy for bighorn sheep is based on a faulty assumption that managing for small, isolated populations is a sustainable wildlife management approach. The Department of Montana Fish, Wildlife and Parks (Department) and Fish & Wildlife Commission (Commission) have distinct roles and responsibilities under the public trust doctrine, and jointly manage the public's fish and game resources for the benefit of present and future generations using the best available science as articulated in the FWP Vision 2016 -2026. These are the public's resources, and to manage them at the cusp of extirpation or deterioration of the genetic stock represents a violation of this public trust.

Whether it is the loss of a herd or the loss of genetic information, the current approach to bighorn sheep management threatens the long term viability of Montana's bighorn sheep herds. We are petitioning for an amendment of the 2010

Montana Bighorn Sheep Conservation Strategy (Strategy) and the repeal of the recently created HD 330 because we believe that bighorn herds in Montana are imperiled throughout the state and that the status quo management approach will lead to unacceptable deterioration and loss of the public's wildlife resources.

3. The status quo of managing for small, isolated populations of bighorn sheep as reflected in the 2010 Bighorn Sheep Conservation Strategy threatens the long term viability of bighorn sheep in Montana.

In Montana bighorns have been reduced to only 48 herds totaling 4,000-6,000 animals, most of which are now in small isolated populations (Butler et al. 2013, Dickson 2011, Erickson 2001, Montana Fish, Wildlife & Parks 2010). Currently 72% of Montana's bighorn populations (35 of 48) have less than 100 individuals, indicating that many of the state's populations are marginally viable at their current population sizes (Garrott et al. 2015).

Small bighorn populations, often reduced by disease, face high predator-prey ratios and genetic problems including inbreeding, genetic drift, loss of genetic diversity and loss of evolutionary potential. Thus, small population size, isolation, disease, genetics and predation interact synergistically to produce a downward spiral toward extinction. Scientific research tells us that larger populations of bighorn sheep with connected habitat persist longer than smaller isolated populations (Berger 1990, Cassaigne et al. 2010, Singer et al. 2001, Singer et al. 2001(b), Smith et al. 1991, Wehausen et al. 2011). While there is debate about what constitutes a "Minimum Viable Population" for any given species (Flather et al. 2011) and bighorns in particular (Cassaigne et al. 2010, Singer et al. 2001(b), Smith et al. 1991), the Department currently operates on the assumption that 125 bighorn constitute a minimum-viable population (Montana Fish, Wildlife & Parks 2010, p. 61). However, there is no support in recent literature[1] for a bighorn minimum viable population anywhere near as small as 125. Indeed, there is growing consensus that multiple populations totaling thousands (not hundreds) of individuals will be needed to ensure long-term persistence of most mammals and to avoid loss of alleles and evolutionary potential (Brook et al. 2006, Dratch and Gogan 2010, Flather et al. 2011, Reed et al. 2003, Traill et al. 2010). Singer et al. (2001) provided an imprecise estimate that 292 bighorn were necessary to recover from a disease episode. Similarly, Cassaigne et al. (2010) suggested 188 bighorn were required to insure persistence in the presence of disease episodes. While these are not minimum viable population estimates they exceed 125.

The state of bighorn restoration in Montana speaks for itself: over half of the 48 bighorn sheep herds in Montana are below 125 animals and only 5 herds are over 300 animals, and more than 21 of Montana's bighorn herds have had one or more disease die-offs since 1982. We believe the current situation warrants urgent

---

[1] FWP bases this standard on a 40-year-old suggestion by Geist (1975) and by extrapolation of results in Berger (1990). Personal communication with J. A. Bailey from Dr. Geist indicates the 1975 suggestion was based upon the little information available at the time, it had no objective basis, and Geist no longer supports this idea. Extrapolation from Berger (1990) to indicate support for a bighorn MVP of 125 is not warranted. Berger did not specify the sizes of herds in his "100+" category and he had sample sizes of only 1-3 such herds surviving beyond 50 years. He had no data for herds surviving, or going extinct, beyond 70 years. Reed et al. (2003) also used Berger's bighorn data and concluded that 775 animals may be needed for only a 50% probability of persistence for 40 generations.

Commission review and modification of the Strategy. The two specific amendments we seek to the Strategy are (1) review of whether 125 is a justifiable minimum viable population, and (2) review of the prescriptive harvest management criteria that authorizes removal of animals from small, isolated herds.

4. The criteria for prescriptive harvest management allows for harvest of critically small herds, and cannot be considered a sustainable management approach in the long term. The Greenhorn herd has not met its minimum population target established in the Strategy at which hunter harvests can be recommended.

The Department's focus on the status quo of managing for small, isolated populations is reflected in its application of prescriptive harvest management. On page 222 of the Strategy, four criteria are given for when the Greenhorn population can sustain a minimal harvest. Hunting will be recommended when at least three of the four criteria are met:

1) The population is at least 75 observable sheep.
2) There are at least 30 rams: 100 ewes.
3) More than 30% of the rams are at least ¾-curl.
4) There are at least 30 lambs: 100 ewes.

The last four observed counts of the Greenhorn herd have been: 59 (2015), 46 (2016), 42 (2017), 41 (2018). Thus:
1) The Greenhorn herd does not meet the first criteria of 75 observable sheep.
3) The Greenhorn herd meets the criteria of more than 30% of the rams of at least ¾ curl based on biologist observation notes.
2) & 4) The ram: ewe and lamb: ewe ratios used for the remaining criteria illustrate the fallacy of assuming that small, isolated populations may be managed the same as larger, connected populations. Under the ratios here, a hunt may proceed on a herd as small as 16 (10 ewes, 3 rams, 3 lambs). The long term viability and effects of harvesting individuals in a herd of 16 versus a herd of 50 versus a herd of 125 versus a herd of 1000 are drastically different. While the Greenhorn herd may meet three of the four criteria, it is highly questionable whether authorizing hunts on herds less than 75 using these criteria is reasonable and meets the Department's public trust duties to manage wildlife resources for the enjoyment of current and future generations and the Constitutional imperative to avoid depletion of natural resources.

These criteria are used not just for the Greenhorn herd, but also for prescriptive harvest management of small, recovering populations across the state (Montana Fish, Wildlife & Parks 2010, p. 39 – 40). Most of Montana's bighorn herds could be considered small, isolated and/or recovering and subject to these criteria. The credibility of the Department and the Commission to responsibly manage the public's wildlife resources is called into question when the criteria underpinning harvest decisions would theoretically allow removal of animals from a herd of 16, and which continue to justify the removal of animals from herds that are not meeting their individual population management objectives. For instance, the Greenhorn herd

has not met its herd management objective which states on p. 221 that "[…] it is not likely that hunting could be expected to occur prior to the population reaching an observed level of at least 125 animals."

Indeed, the Greenhorn herd and most herds in Montana are more appropriate for supplementation and other forms of genetic rescue rather than removal. Pages 57 – 58 of the Strategy read: "Thus, any bighorn sheep population that has been small (e.g., less than 50 to 100 breeding adults) and isolated for more than two to three generations (approximately 10 to 15 years) could be considered as a candidate for genetic rescue." The Greenhorn herd in question for the recently created HD 330 meets this definition.

The Greenhorn herd has struggled throughout the 14 years it has been on the landscape. The Greenhorn herd has not recovered to its initial population size of 69 animals, and is certainly far below the Strategy's stated minimum viable population of 125. Even if we were to generously assume that the actual population of the Greenhorn herd is double what the observed count is (hovering around 40), the total population would then only be approximately 80 animals, with an effective breeding population of 8 individuals and by the Strategy's own definition a candidate for genetic rescue. This herd and other herds of similar size cannot be said to be stable and thriving, and are more appropriate not for removal of animals but genetic rescue through additional transplants and connectivity to other populations across a larger landscape.

The Montana Constitution protects "the opportunity to harvest wild game is a heritage that shall forever be preserved" and states that "the legislature shall provide adequate remedies to prevent unreasonable depletion of natural resources." Petitioner supports and cherishes the ability to pursue fair chase hunting in accordance with the Montana Constitution and affirms the harvesting of wildlife as one tool to be used in the proper management of wildlife populations.

However, it is petitioner's view that the current strategy for managing small, isolated populations of bighorn sheep - most of which are far below the already inadequate minimum viable population target of 125 - unduly threatens the ability for current and future generations of Montanans to partake in this Constitutionally protected hunting heritage. The current approach as reflected in the Strategy, and which serves as the basis for issuing hunts on an observed population of approximately 40 animals, keeps herds in perpetual risk of die-offs whether through natural (e.g. predation, inbreeding) or anthropogenic (e.g. domestic sheep and goat disease exposure) forces. A strategy that ensures thriving and self-sustaining bighorn sheep populations resilient to stressors is the long term approach needed to protect the Constitutional right to harvest wild game in perpetuity. To do this requires interconnected populations across a broad variety of landscapes. The status quo of managing and hunting small, isolated populations is not in the best interest for conserving the wildlife and its associated recreational opportunities and is a violation of the Commission's public trust duties.

5. Petitioner has presented its concerns to the Commission and the Department at numerous times prior to the submission of this Petition, but with no change in action or incorporation of these concerns into bighorn sheep management.

GWA has been active in bighorn sheep restoration efforts in Montana for decades, particularly in southwest Montana. A key concern for GWA is the genetic

fitness and long term viability of bighorn populations. At numerous times GWA has raised these issues and identified relevant scientific findings with individual commissioners (e.g. conversation and email exchange with Dan Vermillion 06/23/15), submitted public comments for relevant Department proceedings (including the original drafting of the Strategy), testified at public Commission meetings (most recently at the April 19th Commission meeting), and actively engaged in stakeholder groups (e.g. Gravelly Landscape Collaborative), and comments raising concerns with the creation of HD 330 with Dan Vermillion (01/26/2018) and Dean Waltee (01/24/2018).

Additionally, similar concerns have been submitted through formal comment periods at federal land management agencies, including to the USFS Beaverhead-Deerlodge National Forest on 02/07/17 and to the BLM for domestic sheep Allotment Management Plans. GWA is also actively litigating domestic sheep grazing allotments in the nearby Gravelly Range and at the U.S. Sheep Experiment Station in the Centennials.

Despite this active and ongoing engagement from GWA, concerns about the current management strategy have not been addressed. Public comments have been unsuccessful in getting either the Department or the Commission to incorporate petitioner concerns into management decisions, leaving few options for public recourse. Petitioner has low confidence that public comments in December for next season's harvest management decisions would result in any change, as past hunter harvests could be used to claim a stable herd, neglecting herd genetic quality to justify continued animal removal. It is not petitioner's wish to submit the same arguments at each future harvest management decision, but for the Department and Commission to take the necessary hard look at whether the status quo of harvesting from isolated populations below the inadequate minimum viable population standard of 125 is in accordance with the best available science.

Indeed, a response from MFWP wildlife biologist Dean Waltee on 01/25/2018 reflects the Department practice of harvesting individuals from small populations and using population vital rate ratios to justify these harvests: "The existing Bighorn Sheep Management Plan outlines that hunting season recommendations will be based much on population vital rate ratios. Ratios are monitored and reported because the metrics are comparable within and between populations through time, ***regardless of population size*** [...] I would argue that reporting only the raw numbers observed could also be misleading [...]" (Emphasis added) (Email exchange with Dean Waltee, 01/25/2018). Unless Commission guidance directs the Department otherwise, the current guidance set out in the Strategy could lead to a harvest on a herd as small as 16 individuals, since ratios and not raw observed count data will be relied upon when making harvest management decisions. The email continues: "The proposed harvest opportunity is consistent with other bighorn sheep harvest opportunities that have been or were sustainable until some non-hunting harvest form of mortality facilitated population decline [...] The proposal is much more conservative than hunter-harvest opportunities that have been sustained for decades across isolated mountain goat populations with similar average minimum observed populations."

However, many native mountain goat herds are declining significantly across their entire range (Dr. Bruce Smith, Personal Communication 2018). Furthermore, bighorn sheep are more susceptible than mountain goats to die offs due to pneumonia contracted from domestic sheep. Bighorn sheep disease die-offs will likely continue to be a significant form of non-hunting harvest mortality, which facilitates population decline. Notably, this email message neglects to mention the strong potential that declining genetic quality contributes to bighorn disease outbreaks and to poor population performance following such events. Moreover, in light of the continued risk of pneumonia contraction from domestic sheep for the Greenhorn herd, Cassaigne (2010) and Singer's (2001) findings that recovery from a disease incident requires a population over the current minimum population standard of 125 are particularly relevant.

Bighorn sheep restoration may elicit different viewpoints from different stakeholder groups, but it is the Department's duty to use the best scientific information to manage wildlife resources for sustainable use in both the short and long term following appropriate direction from the Commission. Ignoring the need to shift from small, isolated populations that are exposed to die offs, genetic deterioration, and which require repeated supplements to keep herds on the landscape, has resulted in over half of the managed herds being at perpetual risk of extirpation. The majority of Montana's herds are not self-sustaining, circling an extinction vortex, and the effects of inbreeding on the genetic stock are resulting in the permanent deterioration of these wild resources. It is the Commission's responsibility to ensure that management decisions and the long term direction of bighorn restoration adequately protects the public's resources, is based upon the best available science, and is made for the benefit of all current and future generations of Montanans.

6. Commission has the authority to address Petitioner's concerns.

In the matter of amending the 2010 Bighorn Sheep Conservation Strategy, the Commission has the authority to set bighorn sheep management and conservation policies for implementation by the Department. MCA 87-301(a) states the Commission has the authority to "set the policies for the protection, preservation, management, and propagation of the wildlife, fish, game, furbearers, waterfowl, nongame species, and endangered species of the state and for the fulfillment of all other responsibilities of the department related to fish and wildlife as provided by law;" Managing the wildlife resources of the state in a matter consistent with the best available science and that provides hunting opportunities to current and future generations is thus within the power of the Commission.

The Commission can direct the Department to initiate a review or updating of the 2010 Bighorn Sheep Conservation Strategy. Given that it has been approximately a decade since the original drafting of the Strategy, we believe such a course of action would be prudent and would allow for an informed process to consider the successes and challenges remaining in bighorn sheep management in Montana, and to make any necessary amendments to both the general strategy and to herd specific management plans. We specifically ask the Commission to (1) amend the prescriptive harvest management criteria for herds failing to meet minimum viable population targets, and (2) to direct the Department to conduct a review on the best available science on what a genetically adequate minimum viable population for bighorn sheep should be, as we believe the most recent literature

suggests the current minimum viable population target of 125 is off by an order of magnitude and does not adequately ensure the genetic health and long term viability of bighorn sheep in Montana.

In the matter of repealing the Greenhorn hunt, the Commission has the authority to adopt Hunting Seasons and Hunting Districts. The decision to open a new HD 330 and issue one limited bighorn sheep license was made following Department recommendation at the February 15th, 2018 Commission meeting.

The Commission has the authority to modify or cancel any hunting permits due to wildlife health concerns. MCA 87-1-304(4) states: "The commission may declare a closed season on any species of game, fish, game birds, or fur-bearing animals threatened with undue depletion from any cause." "Undue depletion from any cause" could arguably be defined as natural predation and mortality, disease events and die-off following contact with domestic sheep, or depletion of the genetic stock through inbreeding and genetic drift. All these causes threaten the small, isolated Greenhorn bighorn population, which has animals now only 3-4 miles from adjacent domestic sheep allotments and/or trailing routes on public lands.

Finally, the Commission may choose not to issue a license in upcoming seasons or to close a Hunting District. Should the repeal of the new HD 330 be infeasible for the upcoming 2018 season, Petitioner requests that consideration be given to the status of the Greenhorn herd and other small, isolated populations across the state that require perpetual, costly management intervention, before issuing new licenses in subsequent seasons.

The Commission is the appropriate entity in which to establish or amend long-term conservation strategy. Within the public trust doctrine by which the public's wildlife resources are held, the Department might be more appropriately classified as a public trust manager, while "citizen commissioners to whom the legislatures have delegated limited rule-making authority, are the primary trustees under the [Public Trust Doctrine]." (Smith 2011, 1540). Publicly available language on the FWP website[2] reflects this division of duties:

> "In summary, the Department administers the day-to-day activities of the Department under the executive branch with specific statutory duties and the Commission sets fish and wildlife regulations, approves property acquisitions, and approves certain rules and activities of the Department as provided by statute."

The Department has been unable to achieve its statewide objective to: "Establish five new viable and huntable populations over the course of the next 10 years and augment existing populations where appropriate" (Montana FWP 2010; page 5, #6). The Greenhorn herd at 41 observed animals in 2018 is neither viable or appropriate to hunt. The responsibility to properly manage for the long term viability of bighorn sheep and associated recreational opportunities in the state thus falls to the Commission, including when necessary directing the Department to make appropriate changes to conservation strategies and management plans. We believe the status quo of managing for and harvesting from small, isolated populations of

---

[2] http://fwp.mt.gov/doingBusiness/insideFwp/commission/. Accessed 28 May 2018.

bighorn sheep will lead to the long term depletion of the genetic stock, if not resulting in the outright extirpation of bighorn sheep from the landscape, and as such is in violation of the Commission's public trust responsibilities.

AMENDMENT:

Amend or order an independent review of the following provisions of the 2010 Montana Bighorn Sheep Conservation Strategy:

(1) The prescriptive harvest management criteria for herds failing to meet minimum viable population targets, particularly the reliance on population vital rate ratios (ram: ewe and lamb: ewe) over observed raw count data.

(2) Use of 125 as a minimum viable population target for bighorn sheep.

REPEAL:

(1) Repeal of the creation of a new HD 330 – Greenhorn Mountains with 1 limited bighorn sheep license 330-10.

7. Petitioner requests an oral presentation for expression of petitioner's and other interested persons' views before the Commission.

Petitioner believes Commission attention to this matter is urgent and necessary. It has now been a decade since the original drafting work of the 2010 Bighorn Sheep Conservation Strategy, and Petitioner believes that an open and public review of the success of the Strategy is warranted to evaluate whether Strategy objectives are being met and to assess the current health of bighorn herds after 8 years of management under the Strategy.

WHEREFORE, petitioner requests the Montana Fish, Wildlife & Parks to (1) Amend the 2010 Bighorn Sheep Conservation Strategy in accordance with the scientific record showing that managing for small, isolated populations is not an effective wildlife management strategy, with particular attention paid to what constitutes a minimum viable population and criteria for prescriptive harvest management on herds that fall under this minimum standard; and if necessary initiate a new statewide bighorn sheep conservation strategy.

(2) Repeal the opening of a new bighorn sheep hunting district, HD 330 – Greenhorn Mountains with limited bighorn sheep license 330-10 (any ram), until the population reaches a sustainable level at or above the Department's minimum viable population of 125.

/s/ Glenn Hockett
GLENN HOCKETT

Volunteer President
Gallatin Wildlife Association

LITERATURE CITED

Berger, J. 1990. Persistence of different-sized populations: An empirical assessment of rapid extinctions in bighorn sheep. Conservation Biology 4:91-98.

Brook, B.W., L.W. Traill, and C.J. A. Bradshaw. 2006. Minimum viable population sizes and global extinction risk are unrelated. Ecology Letters. Vol 9(4):375–382.

Butler, C. J., R. A. Garrott and J. J. Rotella. 2013. Correlates of recruitment in Montana bighorn sheep populations. Fish & Wildlife Management and Ecology Department. Montana State University.

Cassaigne, I.G., R.A. Medellin, and J.A Guasco. 2010. Mortality during epizootics in bighorn sheep; effects of initial population size and cause. J. Wild. Diseases 46(3): 763-771.

Dickson, T. 2011. Bighorn Sheep: What's halting their progress? Montana Outdoors. March/April 2011. pp. 8-15.

Dratch, P. A., and P. J. P. Gogan. 2010. Bison Conservation Initiative: Bison Conservation Genetics Workshop: report and recommendations. Natural Resource Report NPS/NRPC/BRMD/NRR—2010/257. National Park Service, Fort Collins, Colorado.

Erickson, G.L. 2001. Montana bighorns. Montana Outdoors. July/Aug. 2001. pp. 13-15.

Flather, C.H., G.D. Hayward, S.R. Beissinger, and P.A. Stephens. 2011. Minimum viable populations: is there a 'magic number' for conservation practitioners? Trends in Ecology and Evolution. 26(6):306-316.

Garrott, R., K. Proffitt, J. Rotella, and C. Butler. 2015. The role of disease, habitat, individual condition, and herd attributes on bighorn sheep recruitment and population dynamics in Montana. Federal Aid in Wildlife Restoration Grant W-159-R Annual report, February 15, 2015.

Geist, V. 1975. On the management of mountain sheep; theoretical considerations. In J.B. Trefethen, ed. The wild sheep in modern North America. Boone and Crocket Club, Alexandria, Virginia. pp 77-98.

Montana Fish, Wildlife & Parks. 2010. Montana Bighorn Sheep Conservation Strategy. Wildlife Division, Helena, Montana.

Reed, D.H, J.J. O'Grady, B.W. Brook, J.D. Ballou, and R. Frankham. 2003. Estimates of minimum viable population sizes for vertebrates and factors influencing those estimates. Biological Conservation 113:23–34.

Singer, F.J., V.C. Bleich, and M.A. Gudorf. 2001. Restoration of Bighorn Sheep Metapopulations in and Near Western National Parks. Restoration Ecology, Vol. 8:14-24.

Singer, F.J., L.C. Zeigenfuss, and L. Spicer. 2001(b). Role of patch size, disease, and movement in rapid extinction of bighorn sheep. Conservation Biology 15(5):1347-1354.

Smith, T.S., J.T. Flinders, and D.S. Winn. 1991. A habitat evaluation procedure for Rocky Mountain bighorn sheep in the intermountain west. The Great Basin Naturalist 51(3):205-225.

Smith, C.A. 2011. The role of state wildlife professionals under the public trust doctrine. The Journal of Wildlife Management 75(7):1539-1543.

Smith, B. 2018. Presentation on the Status of Mountain Goats, Hosted by Gallatin Wildlife Association, March 14, 2018, Large Community Room, Bozeman Public Library.

Traill, L.W, B. W. Brook, R. R. Frankham and C. J .A. Bradshaw. 2010. Pragmatic population viability targets in a rapidly changing world. Biological Conservation 143(1):28-34.

Wehausen, J.D., S.T. Kelley, and R.R. Ramey II. 2011. Domestic sheep, bighorn sheep, and respiratory disease: a review of the experimental evidence. California Fish and Game 97(1):7-24.